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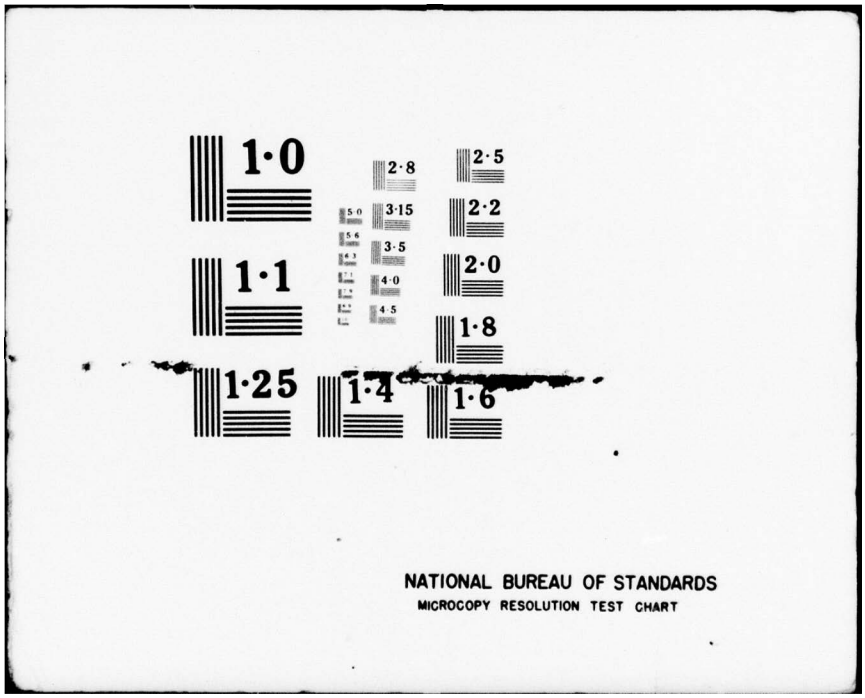
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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

COMPARISON OF METHODS CURRENTLY EMPLOYED BY THE COMMERCIAL AIRLINES AND THE UNITED STATES NAVY WITH RESPECT TO THE ACQUISITION AND DEVELOPMENT OF AVIATION MAINTENANCE MANAGERS.

by

Bryan Alexander Wilson

September 1977

Thesis Advisors: T. D. Matterson
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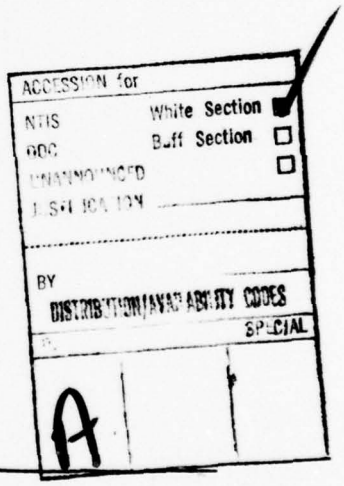

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This report presents the results of a study conducted to determine the methods currently employed by the Commercial Airlines and the United States Navy to acquire and develop Aviation Maintenance Managers. Background information gathered from a detailed literature search and personal interviews with senior commercial airline and Naval Maintenance Management personnel is presented, compared and differences identified. An assessment of the Navy's Aviation Maintenance Management is then made and recommendations for improvement provided.

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I. INTRODUCTION

A. BACKGROUND

The need to provide a cadre of highly motivated, fully trained, career maintenance managers of the highest caliber had long been recognized in the Navy but high level attention was not specifically focused on this requirement until the "Memphis Plan" (Reference 1) recommendations were completed in early 1959. The "Memphis Plan" pointed out that with the dramatic increase in cost and complexity of the Navy's weapon systems and related support the problem of coordinated maintenance became critical. The lack of men, material and money only aggravated and attributed to the Navy's inability to insure the optimum readiness posture of aeronautical equipments. In order to obtain a proper balance between operational requirements, a high degree of maintenance management coordination had to be assured. This resulted in a recommendation to establish a career aviation maintenance program. It continued to be obvious that a program to obtain, train and retain aviation maintenance management officer specialists be implemented but no immediate results materialized between 1959 and 1967, although various agencies strongly reiterated the requirements for such a program to higher authority (References 2 through 12). All these letters/reports and recommendations again reiterated the requirements for the development of a sorely needed program and career pattern for professional aeronautical maintenance officers in order to provide the required continuity of the Navy's readiness effort and the evolution of a cohesive career aviation maintenance community.

In June 1967, Commander, Naval Air Systems Command, as prospective Code Advisor, reviewed and forwarded to the SECNAV the BUPERS memorandum on the proposed aeronautical maintenance duty officer implementation package. Basically the implementation package recommended: that the AMDO (Aeronautical Maintenance Duty Officer), 152X designator, be included as part of the Navy structure; that COMNAVAIR (Commander Naval Air Systems Command) be designated as advisor of the 152X community; that BUPERS (Bureau of Naval Personnel) Instruction 1120.33 series be specifically modified to include the 152X designator; that SECNAV approve publicity releases; and that a precept for a special restricted line transfer board for the initial selection of AMDOs be established.

In March 1968, the Secretary of the Navy approved the establishment of the AMDO program as part of the AED (Aeronautical Engineering Duty) category. BUPERS Note 1120 of 13 September 1968 announced the establishment of a separate AMDO designator (152X) and solicited applications from eligible personnel. In December 1968, the first one hundred AMDOs were selected. From December 1968 to the present, April 1977, the community has grown to 424.

B. OBJECTIVE

Since 1968, the maintenance management requirements imposed on maintenance managers has changed just as the complexity of the equipment they must maintain has changed. Thus, the objective of this thesis is twofold, i.e.; (1) To identify, as a result of these changing requirements, how the commercial airlines and the United States Navy currently acquire and develop their aviation maintenance managers; and (2) Once defined, they are then compared, the differences identified, evaluated

and, based on the information and knowledge acquired from this investigation, provide recommendations that will improve the manner in which the Navy acquires and develops AMDOs.

C. SCOPE

The subject thesis attempts to identify and compare how the commercial airlines and the United States Navy acquire and develop maintenance managers. The thesis addresses only middle and upper level management with no attempt being made to suggest or identify a right or wrong way. The results of the study are based on information gathered from literature searches and personal interviews with middle and upper level managers of both industry and the United States Navy. Recommendations are addressed to and for Navy use.

II. METHODOLOGY

The method used to arrive at the Conclusions and Recommendations presented in Sections V and VI consisted of:

A. LITERATURE SEARCH

The Literature Search consisted of two phases. The first phase was to review the material available at the Postgraduate School Library. This included both published material and the work accomplished as a result of past theses efforts. Upon completion of the local material search, the Defense Documentation Center was queried in an effort to acquire additional background material.

B. PERSONAL INTERVIEWS

Personal interviews were used as the primary mode of data collection to establish the methods employed by the commercial airlines and the

United States Navy to acquire and develop their maintenance managers. Personnel from high and middle level management from both the commercial airlines and the United States Navy (Senior Vice Presidents and Captains) were then selected and interviewed.

Interviewees were selected on the basis of their reputation within their communities and where areas of disagreement existed within a given community it was attempted to gather data with respect to both sides. It should also be noted with respect to the United States Navy personnel, that interviews were conducted in such a manner as to reflect the unique management requirements associated with the operation of an afloat maintenance activity as well as ones ashore.

C. DATA ANALYSIS

Upon completion of the Literature Search and the Interviews, the data associated with the airlines were isolated. Methods used by the airlines to acquire and develop their maintenance managers were identified, as were the differences among the airlines. Once the manner in which the airlines developed their maintenance managers was identified, the procedure was applied to the data collected with respect to the United States Navy. Now having identified how both the commercial airlines and the United States Navy acquired and developed their maintenance managers, a comparative analysis between the two methods was conducted and the differences identified. The differences were then compared for possible application within the United States Navy. Based on the results of this comparison, the Conclusions (V) and Recommendations (VI) were developed.

III. DATA COLLECTION

The Data Collection phase of this research effort yielded the following information:

A. LITERATURE SEARCH

While there is an abundance of research data/information available that addresses management in general and the acquisition and training of technicians specifically, there is little research information available that deals specifically with the acquisition and training of aviation maintenance managers. Thus, with the exception of various military publications, the Literature Search was of little help with respect to providing research oriented background information on the acquisition and training of aviation maintenance managers.

B. INTERVIEWS

Interviews with the following sources provided the following information:

1. Airline Interviews

Maintenance personnel at the upper and middle management levels of four major airlines were interviewed and requested to comment on the following topics: a) background of maintenance managers, b) how maintenance managers are obtained, c) in-house training programs, d) how in-house training programs are developed, and e) their associated maintenance management development concepts.

In general, the results of the interviews with the airlines were consistent in that they were in agreement with respect to the following:

a. Background of Maintenance Managers

In order to be an effective maintenance manager, an individual must have some practical "mechanical" experience or have "mechanical" aptitude.

b. How Maintenance Managers Are Obtained

Each airline interviewed stressed the fact that all the maintenance managers were in-house products, i.e., came up through the ranks within the organization with a majority entering into maintenance management from the maintenance (mechanic) area as opposed to engineering. It is the general consensus that engineers with no practical experience or mechanical aptitude make poor maintenance managers in that they cannot communicate with the "mech," do not basically understand the "mech's" problems (cannot associate) and do not understand the difference between "fixing" something and designing it.

c. In-House Training Programs

Each airline interviewed had an in-house training program ranging from small informal in-house programs to external ones leading to degrees in a maintenance related area.

d. How In-House Training Programs Are Developed

In all cases in-house development programs evolved on an as need basis, i.e., if an airline felt that management personnel needed labor relations training in order to deal with or understand union problems it was provided. One airline even went to the extent of reviewing each maintenance managers background and then tailoring the necessary training to the individual's specific needs.

e. Maintenance Management Development Concept

Each of the airlines interviewed had basically the same philosophy with respect to the development of maintenance managers in that each airline emphasized acquisition and development from within the ranks preferably from the "mech" area but not neglecting other potential in-house candidates. In all cases a very rigid screening process existed ranging from the "one man" approval to that of passing review boards made up of supervisors and current maintenance managers.

The only area where the airlines are not in complete agreement is the requirement for maintenance managers to be a graduate of an accredited college program. Two of the airlines, while not explicitly requiring a degree, prefer that employees advancing to the management ranks have a two year college certificate and have taken steps to set up programs by which employees can obtain a degree at the airline's expense.

Detailed summaries of the airline interviews are provided in Appendix A.

2. Military Interviews

Selected Naval personnel at middle and upper level management (captains and commanders) with afloat/ashore experience at both organizational and intermediate levels of maintenance were interviewed with respect to: a) how maintenance managers are acquired, b) entry training, c) in-house training programs, and d) areas of concern with the present system.

These interviews reflected the following:

a. How maintenance managers are acquired--maintenance managers are acquired from the following sources:

(1) Limited Duty Officers Ranks (LDO).

(2) Naval Enlisted Scientific Education Program (NESEP).

(3) Flight Attrites (137X/139X)--Pilots/NFOs in training.

(4) Wing Drops (131X/132X)--Pilots/NFOs who for some reason or another have decided to stop flying.

(5) "Grow-your-own"--personnel with no previous military experience who have completed Aviation Officers Candidate School (AOCS).

Appendix C provides additional information with respect to background associated with each of the above sources and the AMDO entry requirements.

b. Entry Training--All personnel entering the 152X program receive the same "indoc" training consisting of:

(1) Aviation Maintenance Officers (AMO) School--a sixteen week school covering organization structure, management/administrative procedures, data processing systems, and management aspects of the Naval Aviation Maintenance Program.

(2) Joint Aviation Supply and Maintenance Material Management (JASMMM) School--A three week course aligned to technical supervisory and management skills in aviation material management and local supply support procedures.

c. In-house Training Programs--Once becoming a member of the AMDO community, the following training is available in addition to that acquired through normal rotation (OJT) of assignments.

(1) Naval Postgraduate School--Six billets leading to an advanced degree in management.

(2) Air Force Institute of Technology--One billet leading to an advanced degree in logistics management.

(3) Industrial College of the Armed Forces--One billet leading to advanced education in military management.

(4) Short courses provided at the discretion of the local activity.

(5) Off-duty hour programs leading to a bachelors/masters degree supported and funded by the Navy.

See Appendix D for the typical AMDO career plan and billet assignment.

d. Areas of concern with respect to the present AMDO program:

(1) In the past the majority of AMDOs came from the LDOs and Wing Drops all of which had maintenance experience. In the last few years the make-up of new entries has changed, i.e., the majority now consist of Flight Attrites and new service entries who have just completed AOCS and possess a "degree" but have little, if any, maintenance experience. The lack of experience or mechanical aptitude raises the following questions:

(a) Is current entry training adequate in light of the background change in the new AMDO entries?

(b) Should entry criteria be strengthened to require practical experience or should additional training be provided?

(c) By stressing degree requirements is the Navy sacrificing quality of performance?

(2) Another area of prime concern is how do you make sure these young entries will be "up to the job" when the time comes. Interviews indicated that steps are being taken at the local level by

individuals to try and see that this does not happen--but what is being done across the board?

(3) Emphasis on "sea duty" not being stressed as strongly as it should.

(4) The system does not provide the specialized education required for certain assignments.

(5) Does the current system really provide/meet the maintenance management needs of the future?

The only concern in which there appeared to be disagreement was with respect to the necessity for practical experience. The disagreement in this area was a matter of how much, in that some felt that the experience acquired by Wing Drops was adequate while others believed that the level of practical experience provided by the LDO is required. It should be noted that all agreed the LDOs were an asset and should be encouraged to enter the 152X community.

Detailed summaries of the Military Interviews are provided in Appendix B.

IV. DATA ANALYSIS

As a result of the interviews with middle and upper level maintenance managers of the airlines and the military, the following comparisons can be made:

A. BACKGROUND OF MAINTENANCE MANAGERS

1. Airlines

The airlines believe that in order to be an effective maintenance manager, an individual should possess practical mechanical experience or aptitude. This is not to say there are not exceptions but based on past experience mechanics with demonstrated leadership capability tend to work out best in the long run.

2. Military

In the past the majority of naval maintenance managers were obtained from the LDO ranks or flying personnel who for one reason or another decided to give up their wings, all of whom had some maintenance background. Currently the majority of entries into the maintenance community consist of flight attrites and as a part of the "grow-your-own" concept personnel with no previous military experience who have completed AOCS.

3. Comparison

Initially it appeared that the Navy and the airlines had the same philosophy in that maintenance personnel had to have maintenance experience. While the airlines have maintained this concept, the Navy, for one reason or another, appears to have drifted away from this concept and is currently emphasizing degrees more than experience. This

observation is supported by Figure 1 in that from year group 1970 98% of the personnel entering the AMDO community possessed degrees while prior to 1970, even with attrition due to retirements, etc., only 80% of the AMDOs possessed degrees. Figure 2 further supports this shift in emphasis in that approximately 28% of the personnel in pay grades at 04 and above do not possess degrees while only 2% in pay grades at 03 and below possess no degrees.

B. HOW MAINTENANCE MANAGERS ARE OBTAINED

1. Airlines

In all cases the airlines obtained their maintenance managers from within house with the majority coming from the maintenance (mechanics) area as opposed to engineering, etc.

2. Military

The military obtain their maintenance managers from the following five sources:

a. LDOs (Limited Duty Officers)

Until recently, LDOs who possess a high degree of "hands on" experience as a result of their enlisted background made up the bulk of the AMDO community.

b. NESEP (Navy Enlisted Scientific Education Program)

NESEPs who, like the LDOs, possess a high degree of "hands on" experience as a result of their enlisted background provide only a few officers to the AMDO community.

c. Flight Attrites

Flight attrites are becoming a prime source of AMDO candidates but due to entry requirements are unknown quantities with respect to maintenance background or aptitude.

AMDO

Educational Background

by Year Group

	1	2	3	4	5	6	7	8	9	60	1	2	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	Total	%
Agriculture			1												1				1		1						1	5	1.2
Architecture																									1			1	
Business		1	1	1	1	1	1	2	2		1					3	1	3	6		6	8	6	4	6	3	8	74	17.4
Education							2							1				4	2		2	1			1	5	2	22	5.2
Engineering			1	1	4	2	4		4		3	1	3	2	3	5	2	2	12	14	16	16	12	21	13	14	17	176	41.5
Fine Arts																											1	1	
Humanities						1																	1					2	
Natural Science			1				3	5	1		2		2		2			4	7		3	5	3	3	6	11	6	69	16.3
Social Science				1							1				1	5		4	2		6	3	2	1	5	1	1	33	7.8
None	1	2		2	2		2	3	3		1	5	1	1	5	4	2	1			2	1	1		2			41	9.7

Figure 1

AMDO

Educational Background

by Pay Grade

	06	05	04	03	02	01	
Agriculture	1		1	2		1	5
Architecture					1		1
Business	4	7	4	34	7	18	74
Education		2	4	6	5	5	22
Engineering	5	13	26	86	18	29	176
Fine Arts						1	1
Humanities		1		1			2
Natural Science	3	5	9	23	16	13	69
Social Science	1	1	8	16	6	1	33
None	5	16	14	4	1	1	41
Total	18	45	66	172	54	69	424
Per Cent	4	11	15	41	13	16	

Figure 2

d. Wing Drops

Wing drops provide a small input into the AMDO community. While lacking "hands on" experience of the LDO, they possess maintenance management experience as a result of their flying background.

e. Grow-your-own

These are personnel completing AOCS (Aviation Officers Candidate School) but like the flight attrites are unknown quantities since entry does not require any demonstrated maintenance experience or aptitude.

3. Comparison

Again, as with the airlines, the Navy initially obtained their maintenance managers from within. With increased emphasis on degrees and the loosening of promotional opportunity within the LDO ranks, this excellent source of maintenance managers has practically ended. With respect to wing drops the other small but prime source of AMDOs in the past this source while small will probably be further reduced as a result of the new Aviation Career Incentive Pay System. Under this new system flying personnel are not required to fly a minimum number of hours each month to collect flight pay only to acquire a specific number of operational months over 12 and 18 years. Thus, if an individual meets his gate early, it is questionable he would give up his flight pay when he does not have to fly to become a 152X. Thus the Navy is left, for all practical purposes, with two major sources of maintenance managers, the flight attrites and the AOCS candidates, most of which have degrees but little, if any, maintenance-related experience. NESEPs are so few they can be ignored.

Review of recent year groups by degrees, Figure 1, will further support the existence of this trend, in that while entries into the AMDO

program are still predominantly engineers, the non-maintenance oriented degreed entries are increasing. This along with the observation that very few of the current entries are non-degreed and with the knowledge that wing drops and NESEPs make up a very small portion of the AMDO community. Again, one can only conclude that current entries are coming from flight attrites and AOCS.

C. IN-HOUSE TRAINING PROGRAMS

1. Airlines

Each of the airlines interviewed has in-house training programs ranging from small informal in-house programs to external ones leading to degrees in a maintenance-related area.

2. Military

In-house training within aviation maintenance consists of entry training AMDO and JASMMM school. Once accepted into the program, approximately eight billets devoted to advanced education are set aside and filled annually. Remaining educational opportunities consist of off-duty bachelor/graduate programs (funded by the service) and selected short courses on an as-available basis assigned at the option of the command.

3. Comparison

Unlike the military, the airlines appear to tailor their training programs to the needs of the individual while the military sets standards for all.

D. HOW IN-HOUSE TRAINING PROGRAMS ARE DEVELOPED

1. Airlines

In-house training programs are developed on an as-need basis and are highly responsive to change.

2. Military

While in-house training programs exist, once established, they are hard to change and not necessarily tailored to the individual.

3. Comparison

The military lacks the flexibility of the airlines.

E. MAINTENANCE MANAGEMENT DEVELOPMENT CONCEPT

1. Airlines

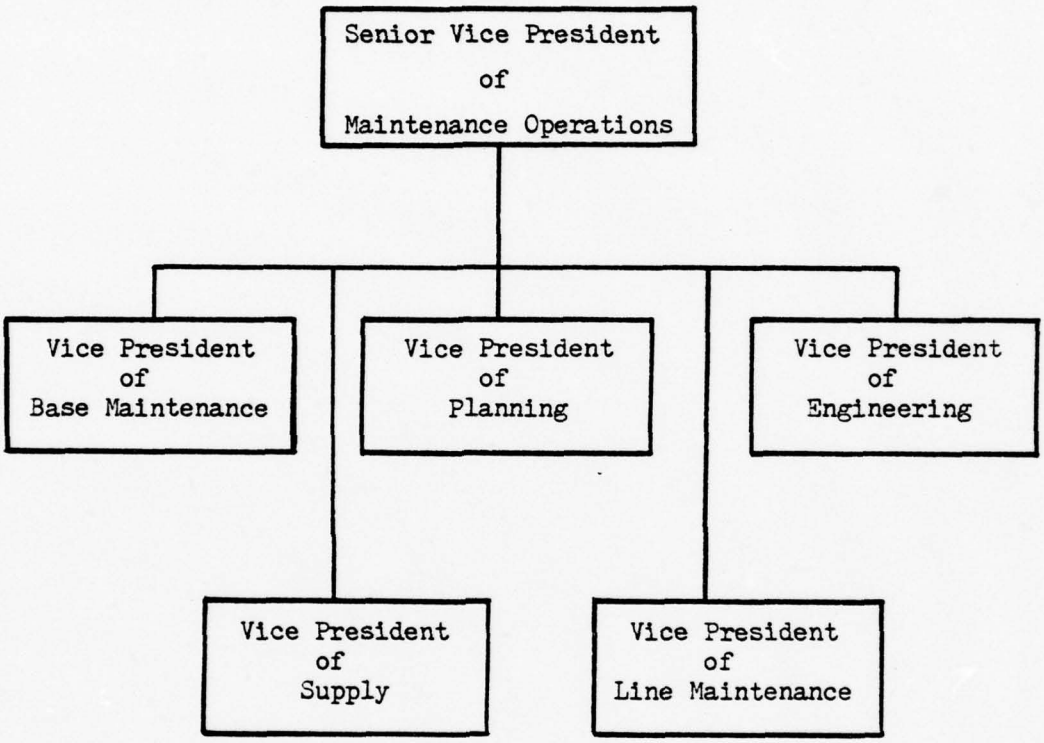
The airlines emphasize acquisition and development from within their organization preferably from the maintenance ranks. Figure 3 represents a typical airline organization. The only area of disagreement is with respect to formal education requirements, i.e., some airlines, depending on their objective, emphasize advanced education (degree) in a maintenance-related field.

2. Military

Currently the military is acquiring most of their potential maintenance managers from the flight attrites and AOCS graduates that possess degrees (see Appendix D for a complete break out of degrees by year group and rank) but are unknown quantities with respect to maintenance background or aptitude.

3. Comparison

Initially the Navy's intent appeared to parallel the airlines with respect to development of maintenance managers, but with the current emphasis being placed on degrees and the improved promotional opportunity within the LDO community and the lack of response from the wing drops, this has forced the Navy into a "grow-your-own" concept which essentially is forcing them into a situation even worse than going outside, i.e., the AMDOs are being "forced" to accept personnel with little



TYPICAL AIRLINE ORGANIZATION

Figure 3

or no maintenance backgrounds. To compound this situation, the current entry training has not been altered to compensate for this background change.

V. CONCLUSIONS

As a result of the foregoing investigation, the following major conclusions are presented:

A. While the airlines continue to develop and promote their maintenance managers from within their organization, changes in policy have forced the Navy to go "outside" and bring young inexperienced personnel into the maintenance community.

B. While some of the airlines stress "advanced education" in order to meet specific objectives for promotion into the maintenance management ranks, it is not a stringent requirement. Practical hands-on experience is still the primary consideration.

C. With the apparent change in "background" of personnel entering the AMDO community, entry training has remained the same in the Navy. In addition, with the exception of individual efforts, there is no evidence that once in the community the necessary additional training will be provided.

D. While many express concern with respect to the decrease in LDOs entering the AMDO community and the weak entry/training requirements which allow young inexperienced personnel with inappropriate backgrounds to enter the AMDO community, there appears to be no concerted effort to correct these deficiencies.

E. The military, by stressing requirements for a degree, may be losing more qualified (LDOs) maintenance managers than they are acquiring.

VI. RECOMMENDATIONS

There is no doubt that the AMDO (152X) community is undergoing a dramatic change in the primary sources of maintenance managers. It is changing radically for reasons both within (LDO situation) and beyond their control (131X/132X requirements). In order to control this situation in such a manner as to insure the development of effective future maintenance managers, the following is recommended:

A. LONG TERM (PLANNING AND CONCEPT LEVEL)

Initiate an effort to establish:

1. Maintenance management requirements of the future (level and number of personnel).
2. Program entry criteria/requirements.
3. Program candidate sources.
4. Complementary entry training based on candidate source/background.
5. Billets that require specialized training.

If the above is accomplished, a coordinated AMDO program, that possesses all the desirable characteristics of the airlines (basic entry requirements, tailored training, etc.) while still meeting unique service requirements (carrier operation, etc.), will evolve.

B. SHORT TERM (IMMEDIATE ACTION)

Until completion of the long term effort and in order to insure the continued flow and development of "quality" maintenance managers, the following is recommended as interim measures:

1. Insure that the current AMDO entries from the flight attrites and AOCS get the necessary training opportunities which will enable these personnel to perform as effective maintenance managers in the future.

2. Initiate a program to encourage LDOs to apply for entry into the AMDO community.

3. Establish those duty assignments that need specialized training and provide a means to acquire this training.

APPENDIX A

Detailed Summary of Airline Interviews

The following are the results of four interviews with senior commercial airline personnel. The subject addressed during these interviews was "How the Commercial Airlines acquire and develop their Maintenance Managers."

Eastern Airlines Interview

Met with Mr. P. Hartline, Mr. R. C. Tripp and Dr. Hopkin and discussed the following:

1. How maintenance managers are selected:

   a. 80% from mechanics who are good to outstanding technically and have demonstrated an administrative ability.

   b. 20% from engineering who are good technically and have a willingness to cope with people.

2. Selection method - IMP (Individuals with Management Potential) Program

   IMP program candidates are selected in the following manner:

   a. Supervisor recommends.

   b. Be promoted to Temporary Foreman.

   c. Individual request (Supervisor must approve).

Once one of the above criteria is met, the individual must appear before a Board where he is asked a series of questions. Eastern has taken a great amount of time to develop this series and it is being continually improved upon. The answers enable the Board to evaluate the individual. Prime consideration is given to stress questions--how the individual

thinks. The Board is made up of other than maintenance managers, i.e., materiels managers, etc. There are five members.

Those people who are selected for the Individual with Management Potential Program are then sent to IMP school where they receive basic management training.

Upon completion they are put in a pool. When vacancies become available, replacements are selected from this pool. Normally, they are selected by a Board with the retiring supervisor making the selection with the agreement of the other Board members.

After a short period on the job, overlapping with the retiring supervisor, if possible, the individual is given experienced supervisory training.

Any additional training of maintenance managers is provided on an as-needed basis. Such courses as Labor Relations are offered in short-course form.

Two weeks every quarter, Eastern holds middle management seminars where selected middle managers spend two weeks away from their offices learning the latest production and control techniques, queuing theory, etc.

3. In summary--the primary considerations with respect to selection of potential maintenance managers are maintenance background and demonstrated leadership capability.

Braniff International Airways Interview

Met with Mr. James McLachlan, Senior Vice President, Engineering and Maintenance, to discuss selection and training of maintenance managers. The discussion was almost a replay of the one with Paul Hartline of Eastern.

1. Questions asked.

   a. What is the background of their maintenance managers?

   b. How are maintenance managers obtained?

   c. What in-house training is offered?

   d. How are in-house training programs established?

   e. What is Braniff's maintenance management concept?

2. Maintenance managers are almost exclusively selected from the maintenance ranks. Braniff is of the opinion that college (degreed) personnel cannot communicate with the technicians. Managers must have worked on equipment in order to be effective managers, although, once in a while you find an engineer with practical maintenance experience or aptitude who might become a good maintenance manager.

3. Selection Method - Personnel are interviewed by selected supervisory personnel under the Senior Vice President. They are then interviewed by the Vice President of Maintenance and Engineering who makes final selection and approval. The Vice President of Maintenance and Engineering is personally involved with selection of all maintenance supervisory personnel.

4. Technical training is provided through OJT, in-house developed class room training programs and special visits to factory for recurrent-on-equipment training. No formal management training for selected "from the ranks" personnel.

5. All maintenance managers are selected from the country being serviced.

Flying Tiger Airlines Interview

Met with Mr. John L. Dewey, Senior Director, Maintenance.

One hundred per cent of maintenance management personnel, supervisor on up, are selected from the maintenance ranks. Higher management wants maintenance managers to have degrees and provides selected personnel the opportunity to obtain a degree through a company-sponsored program. Current maintenance management goes along but does not feel it is as important as higher management. Current managers are provided training on an as-need basis. Flying Tigers currently is emphasizing rapid training of future maintenance managers in that within the next few years, they will experience a complete turnover of upper maintenance managers. Incumbent maintenance managers want to promote from within but with corporate management's desire for degreed personnel and the approaching turnover they may be forced to hire from the outside. This they do not want to do unless absolutely necessary.

Western/Continental maintenance management is refusing to go the degree route in that they believe only people with mechanical/practical experience can communicate with mechanics

In summary, Flying Tiger's beliefs are the same as other airlines, i.e., promote from within, provide necessary training and fire non-performers.

United Airlines Interview

Met with Mr. Tom Matterson, Vice President of Maintenance Administration and established the following:

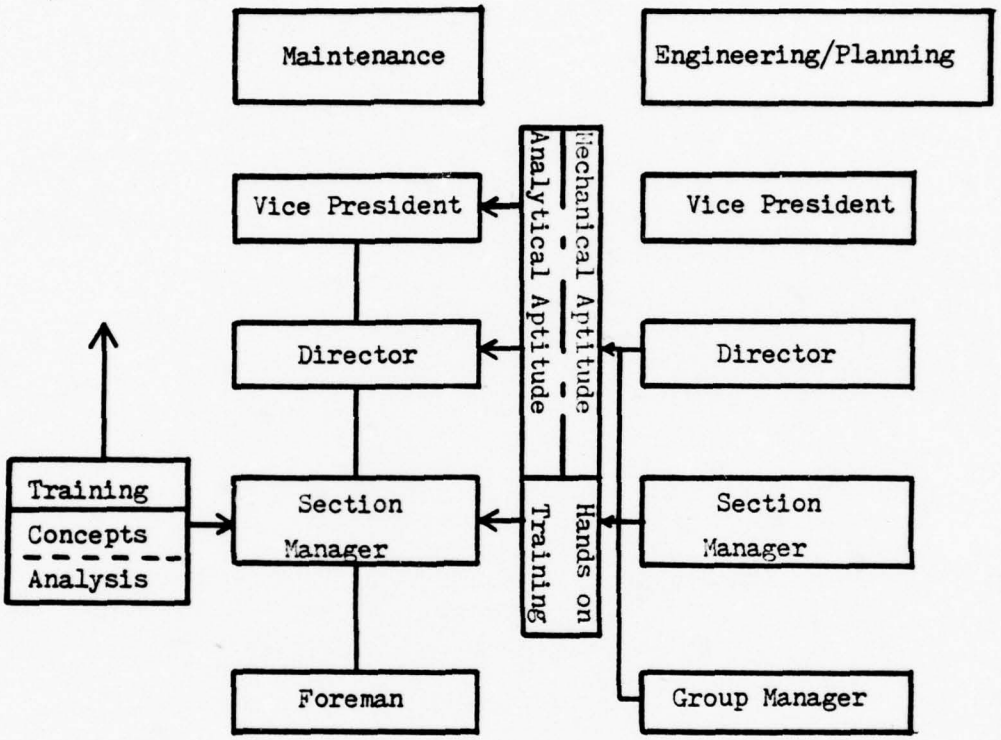
1. Maintenance managers are selected from ranks.

2. Higher level management desires degreed managers.

3. Program has been established by which personnel with potential can acquire the two years of advanced education that management believes necessary for entry into the management ranks.

4. United philosophy is that they want to be technical leaders in the "maintenance field," i.e., they want to keep pushing and improving on the "state of the art." In order to be technical leaders they must acquire/develop technically competent personnel with the educational backgrounds required to accomplish this objective. If the philosophy of an airline, or anyone of the services for that matter, is to be efficient resource managers, i.e., to implement technology developed by others then the requirement for advanced education becomes secondary in nature with practical experience and leadership taking precedence. A basic question the Navy should address is do they want to be technical leaders or efficient resource managers--leaders or efficient followers? Once answered, then a realistic maintenance management training program can be developed which will meet the desired objective.

5. United Airlines, in the selection, training and development of their maintenance managers, follows the process laid out in Figure A-1. Maintenance managers are acquired from two sources generally, the engineering/planning ranks and from the maintenance (mech) ranks. To enter maintenance management from the engineering/planning ranks, candidates are tested for mechanical and analytical aptitude and then provided the necessary "hands on" training needed to accomplish their maintenance-



UNITED AIRLINES

SELECTION, TRAINING AND DEVELOPMENT PROCESS

Figure A-1

related assignments. Entry into the maintenance management ranks is a function of demonstrated technical performance and leadership capability at the mechanic level. Once selected as a potential maintenance manager, personnel are provided training that addresses concepts and analytical techniques, thus, again providing a selection and training program tailored to the needs of both management and the individual.

APPENDIX B

Detailed Summary of Military Interviews

The following are the results of four interviews with senior AMDO captains and commanders. The subject addressed during these interviews was "How the Navy acquires and develops its Maintenance Managers." For various reasons the Naval personnel interviewed will remain anonymous.

Interview A

1. Comments concerning training of AMDOs (Aeronautical Maintenance Duty Officers):

a. Due to the lack of technical (maintenance) experience of personnel currently entering the 152X program, the entry training provided in the past is no longer adequate. Thus, until additional entry training is provided, entry requirements reevaluated (technical), or some action taken to make the entry requirements, training, and performance complement each other, the current maintenance managers must fill the void or the community will be in serious trouble in the near future. The only way to insure that young ensigns and lieutenant junior grades entering the AMDO community get the proper training is, upon completion of the AMD school and Joint Aviation Supply and Maintenance Material Management School, to make sure he is moved around as an assistant to experienced 152X personnel ashore and at sea and not stuck in some desk job such as maintenance administration. Once an acceptable degree of maintenance management experience is obtained, he should then be given more and more responsibility. If the individual does not perform, this failure should be reflected in his fitness report.

b. When an individual approaches a duty assignment such as the Washington, D. C. area, for which he has not been prepared by past experience or education, he should be provided with highly specialized concentrated courses such as civilian personnel, management and contract administration, etc. which will equip him for the subject assignment.

2. Comments concerning Postgraduate School program at Monterey.

a. The course provided should be standard management course such as those found at any management school except they should be aligned to how the Navy and DOD do business and motivate people.

b. With respect to the tour of duty at the school--the tour should be split into two "six month stretches" with a one year operational assignment in between.

c. AMDOs selected for postgraduate school should be a senior lieutenant coming off sea duty or a junior lieutenant commander.

NOTE: Being selected for advanced education (postgraduate school, etc.) is not considered a plus by the 152Xs but more of a handicap since, in the past, personnel with "sea duty," etc. have been, in general, selected over postgraduate types. 152Xs stress operational experience and performance and then consider other factors.

d. Until the 152X community changes its attitude, education-wise, the six billets at the postgraduate school are adequate.

NOTE: The respected way of getting a degree is going to night school while accomplishing tours ashore.

3. Other comments/concerns.

a. While having a degree is desirous for entry into the 152X program, once in, operational experience is stressed.

b. The 152X community is concerned that while a degree is desirous that the AMDOs might be sacrificing the required "practical experience" in order to acquire some degree of professionalism--concerned that the community might be confusing degrees which are to provide more tools to get a job done better and professionalism which is a function of performing to or exceeding given standards. Tightening of entry requirements or adjustment of entry training could possibly alleviate this problem.

c. The 152Xs are fleet oriented and firmly believe that is where you learn.

d. The 152X community must recognize that specialized management training is required for certain assignments and provide this training as necessary.

Interview B

1. Selection Process.

The need for technical (practical) experience is overemphasized. You only need enough technical experience to know when you are being "snowed." Current selection process should be reviewed and updated.

2. Training.

a. 152Xs lack management training. Personnel management should be emphasized and provided for at the ensign/lieutenant junior grade level.

b. Upon entry into the 152X community, personnel with little or no practical experience should be assigned to a "hot spot" for six to twelve months then put through AMDO and JASMMM (Joint Aviation Supply and Maintenance Material Management) Schools.

c. The 152X career ladder (all 152Xs) should include a tour of "staff duty" since AMDOs spend considerable time dealing with staff personnel.

3. Postgraduate School.

a. LDOs at the junior lieutenant commander level should be considered as prime candidates for postgraduate school because of the need for formal business management training at this level.

b. The 152Xs should make more use of the Naval Postgraduate School and the Air Force Institute of Technology for advanced management training.

4. Other comments/concerns.

a. While not in complete agreement with other members of the AMDO community with respect to the requirement for a background with heavy technical/practical experience, the need for as much "sea duty" as possible could not be overemphasized.

b. It was also emphasized that the day when the chiefs took "young ensigns and lieutenant junior grades in tow" and would not let them make mistakes and taught them the technical aspects is over, thus, again, emphasizing the changing Navy environment and the need for continuous AMDO training program review.

c. LDO (Limited Duty Officers) - LDOs are not applying/converting to the 152X community because over the past few years promotional opportunities to lieutenant commander are better in the 6000 series than in the 152X series (AMD).

Interview C

1. The AMDO selection process should be reviewed since entry personnel do not have the same background now as in the past.

2. Training.

a. Again, interviewee felt that only a minimum of technical/practical maintenance experience was required (enough to keep from being "snowed").

b. The need for management training is a necessity but not necessarily the Naval Postgraduate School training but more of the type provided by the Harvard Business School in their sixteen-week course.

3. Postgraduate School.

The value of the Naval Postgraduate School is questionable but billets should be retained because other communities utilize the school for advanced management training.

4. Other comments/concerns.

a. The LDOs should be encouraged to join the 152X community.

b. Again, sea duty is a must in that it is the only way to learn and understand the maintenance end of the operational Navy.

c. The interviewee felt very strongly that personnel motivation and management take precedence over technical/practical experience as long as you have enough technical knowledge to know whether you are being "snowed" or not.

Interview D

1. Selection Process and Training.

a. In the past when most new entries into the 152X community consisted of Limited Duty Officers pilot/flight personnel who for one reason or another chose to "give up their wings" you could assume they had some degree of maintenance training. But with the current situation where entry personnel are ensign "right off the street" types, the requirement for only a degree is not enough. Thus, something has to be done to insure that an applicant has an adequate maintenance background, i.e., improved selection criteria or improved training (A & P indoctrination course) prior to squadron assignment.

NOTE: While a degree is desirable the basic requirement for a maintenance background/experience is still the fundamental requirement.

b. The current maintenance officers and commanding officers have got to stop hiding the young ensigns and lieutenant junior grades in maintenance administration and have got to start training these officers to rightly assume their future maintenance responsibilities, i.e., use experienced officers (LDOs, etc.) and chiefs, if necessary, to train.

2. Postgraduate School

a. The Naval Postgraduate School has its place and the six billets should be retained.

b. Junior lieutenant commanders coming off sea duty should be prime candidates for selection to the Naval Postgraduate School.

c. The 152Xs should develop their postgraduate school course requirements and the school should provide the instruction.

3. Other comments/concerns.

a. A "big push" should be made to encourage LDOs to again apply "in mass" for entry into AMDO program by improving promotional opportunities and emphasizing the fact that while a degree is desirable, it is not required and that performance is still the primary basis for promotions.

b. AMD personnel should not be assigned to staff duty until they are lieutenants with at least one tour afloat.

c. Sea duty is a must for any AMDO since that is what the community was created to support.

d. Degrees should only play a deciding factor in the promotion of an AMDO when all other things are equal, but AMDO personnel should be encouraged to obtain degrees.

e. Practical experience/background is still the key and should not be sacrificed for the sake of other things.

APPENDIX C

Aviation Maintenance Duty
Source of Officers
and
Entrance Requirements

The AMDO community was established in 1968 to meet a critical need in naval aviation for full-time professional maintenance managers. In founding the community the Restricted Line Transfer Board (RLTB) met in late 1968 and selected 100 officers to form a nucleus. Subsequent RLTBs provided additional officers to help sustain the community through the early years of development. The RLTB continues to be the means by which highly qualified officers at all grade levels up through captain can transfer into the AMDO community.

1. Source of Officers

Limited Duty Officers, NESEPs, flight attrites (137X, 139X), and wing drops (131X and 132X) have been the primary types of officers entering the community, with the grow-your-own concept coming of age in the past few years.

a. LDO. The Limited Duty Officer has made up the bulk of officers selected for transfer into the community through the RLTB. This source has declined as expected after the initial selections and has dropped below the desired level. There are qualified LDOs in naval aviation who have all the qualifications except a Baccalaureate Degree. This requirement can be waived by BUPERS if the officer is making some effort toward attaining a degree.

b. NESEPs. The Navy Enlisted Scientific Education Program provides a minimum number of officers for transfer into the AMDO community. The program is specifically designed to provide a path to a commission in the URL for outstanding career-motivated enlisted members. A maximum of 5% may elect to accept a commission in the RL or staff corps. The Navy is reducing the number of NESEP graduates, currently averaging 250 per year, and this downward trend is expected to continue for the next five years to an average output of 150-200 officers per year.

c. Flight Attrites (137X and 139X). Flight attrites are officers who terminate flight or NFO training prior to obtaining their wings. This source provides an input into the AMDO community through the RLTB at the ensign and lieutenant junior grade levels. At present flight attrites comprise about half of the officers transferred into the community.

d. Wing Drops (131X and 132X). Designated aviators or NFOs who terminate their flight status, for whatever reasons, also provide a small input into the community. Most commander grade officers who transfer into the community come from this source.

e. Grow-your-own. The grow-your-own concept directly commissions officers as ensigns upon successful completion of Aviation Officer Candidate School. This is the source which is to sustain the community through the coming years by supplying a steady flow of aviation maintenance oriented and career motivated officers.

2. Entrance Requirements.

The following is a description of the entry requirements that must be met when entering the Navy from:

a. Civilian Status

1) Must be an American citizen.

2) Must meet mental, moral and professional qualifications.

3) Must be physically qualified in accordance with the Navy Medical Department Manual.

4) Must pass an officer aptitude rating examination.

5) Must be considered and recommended for appointment by a board of officers.

6) Age limits--19 to 27½ at time of commissioning. May be adjusted a maximum of 36 months on a month for month basis for prior active duty.

7) A bachelor's degree in engineering, science, management or administration.

8) May be married or single.

9) Civilian applications are submitted through officer program recruiter at Naval Recruiting Districts. NROTC students apply through Naval Science Department at their college or university.

10) Applications may be submitted after completion of 90 semester hours of college academic work.

11) All selectees will attend approximately four months of officer indoctrination training.

12) National Security Agency check must be completed prior to commissioning.

13) Selectees will attend all or part of a 16-week aircraft maintenance officer course at Memphis, TN.

b. USN, USNR or Limited Duty Officer status

1) Should be a graduate of an accredited college or university with at least a bachelor's degree in engineering, science, management or administration.

2) An extensive background in aviation maintenance, and a minimum of three years in fleet units are desirable.

3) Must meet general requirements for appointment and submit applications as outlined in BUPERS Manual, Articles 1020120, 1020150 and 1020170.

4) Officers in a flying status who are selected shall be required to terminate their flying status prior to their appointment as an AMD officer.

5) Transfer of officers between the unrestricted and restricted line of the regular Navy shall be in the grade of captain or below.

6) Limited duty officers must have served at least one year as an LDO, be junior to the grade of commander and in the case of lieutenant commander, shall not have served more than three years from date of rank as lieutenant commander.

APPENDIX D

CAREER PLAN FOR 152X OFFICERS

(INITIAL SHORE ASSIGNMENT)

YRS	GRADE	SEA/SHORE	BILLET
1 2	ENS	SHORE	AIMD/RAG/TRAINING SQD
3 4	LTJG		AIMD/SQD
5	LT	SEA	OVERSEAS DUTY
6 7 8 9		SHORE	AIMD/RAG/TRAINING SQD/NATC NAILSC/PG SCHOOL/NARF
10 11 12	LCDR	SEA	CVW/AIMD/SQD LPH/LHA
13 14 15		SHORE	AIMD/STAFF
16 17 18	CDR	SEA	AIMD
19 20 21		S H O R E	AIMD/CNT/TYCOM/NAVAIR OPNAV/STAFF COLLEGE
22 23 24 25 26 27 28	CAPT		TYCOM/NAVAIR/OPNAV/NAILSC/ NARF/CNT
29 30 31	FLAG	SHORE	TYCOM/NAVAIR/NAVAIR REP/NAILSC

CAREER PLAN FOR 152X OFFICERS

(INITIAL SEA ASSIGNMENT)

YRS	GRADE	SEA/SHORE	BILLET
1 2	ENS	SEA	AIMD/SQD
3 4	LTJG	SHORE	AIMD/RAG/NATC/NAILSC/NARF/ TRAINING SQD
5 6 7 8 9	LT	SEA	AIMD/SQD/OVERSEAS DUTY
10 11 12	LCDR	SHORE	AIMD/STAFF/PG SCHOOL
13 14 15		SEA	CVW/AIMD/SQD/LPH/LHA
16 17 18		SHORE	NAS/TYCOM/NAVAIR/OPNAV/ CNT/STAFF COLLEGE
19 20 21		SEA	AIMD
22 23 24 25 26 27 28	CAPT	SHORE	TYCOM/NAVAIR/OPNAV/NAILSC NARF/CNT
29 30 31	FLAG	SHORE	TYCOM/NAVAIR/NAVAIR REP/ NAILSC

APPENDIX E

AMDO

Educational Background by Year Group

	1	2	3	4	5	6	7	8	9	60	1	2	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	Total	%
Agriculture																													
•Agriculture															1				1		1					1		4	
•Animal Husbandry			1																									1	
			1												1				1		1					1		5	1.2
Architecture																													
•Naval																									1			1	
																									1			1	
Business																													
•Accounting				1																	1							2	
•Aviation Management																			1		1	1	1	1		2	2	9	
•Aeronautical Operation																				1				1			1	3	
•Business Administration		1						1	2							1		2	5	3	5	3	2	3	1	5	3	37	
•Business Management						1											1											2	
•Commerce					1																							1	
•Economics			1																				1		1		2	5	
•Industrial Management																1				2		2			1		1	7	
•Management							1	1			1							1										4	
•Marketing																1					1			1		1		4	
		1	1	1	1	1	1	2	2		1					3	1	3	6	6	8	6	4	6	3	8	9	74	17.4

	1	2	3	4	5	6	7	8	9	60	1	2	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	Total	%
Education																													
• Education							1											1			1				1	1		5	
• Industrial Arts														1				1	1	2				1	1	1	1	9	
• Industrial Education																		1										1	
• Music																			1									1	
• Physical Education							1											1							2		1	5	
• Speech																									1			1	
							2							1				4	2	2	1			1	5	2	2	22	5.2
Engineering																													
• Aircraft Maintenance																		1			1		1			1		4	
• Aeronautical									1	1					1		1	3	4	6	7	8	7	5	7	3	2	56	
• Chemical										1								1	1	1		1	1	1	2	1	1	11	
• Civil							1																					1	
• Electrical			1							1		3	2	1	2			3	3	5	2	1	7	2	1	5	1	39	
• Engineering							1		1									1		2	2			3				10	
• Industrial Design																										1		1	
• Industrial														1				1			1	1	1		1	2		8	
• Industrial Technology					1										1										1		1	4	
• Mechanical						1												1	4	1	2	1	3	1	1	3		18	
• Naval Science				1	3	1	2		2			1		1		2	1		2	1	1		1	1	1	1		22	
• Oceanography															1													1	
• Textile																		1										1	
			1	1	4	2	4		4	3	1	3	2	3	5	2	2	12	14	16	16	12	21	13	14	17	5	176	41.5

	1	2	3	4	5	6	7	8	9	60	1	2	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	Total	%
Fine Arts																													
•Fine Arts																										1		1	
																										1		1	
Humanities																													
•English																							1					1	
•Philosophy						1																						1	
						1																	1					2	
Natural Sciences																													
•Anthropology																				1								1	
•Astronomy																											1	1	
•Biology																			2				1	1	1		2	7	
•Computer Science																										1		1	
•General								1																				1	
•Geology								1													1							2	
•Mathematics							2				1		1					2	3	1	1	3	2	3	3	2	1	25	
•Metallurgical				1				1	1																			3	
•Meteorology																									1			1	
•Physical								1			1		1					1	1		2			2	5			14	
•Psychology								1										1	1	1	1				1	2	1	9	
•Statistics															1													1	
•Zoology							1								1											1		3	
				1			3	5	1		2		2		2			4	7	3	5	3	3	6	11	6	5	69	

	1	2	3	4	5	6	7	8	9	60	1	2	3	4	5	6	7	8	9	70	1	2	3	4	5	6	7	Total	%
Social Sciences																													
•Foreign Affairs															3							1						4	
•Government									1					1					1									3	
•History															2			2	1		2	1		2		1		11	
•International Relations																				1								1	
•Social Science																		2		3	1		1	1				8	
•Political Science				1																2				2	1			6	
				1					1					1	5			4	2	6	3	2	1	5	1	1		33	7.8
None																													
•None	1	2		2	2		2	3	3	1	5	1	1	5	4	2	1			2	1	1			2			41	9.7

AMDO

Educational Background by Pay Grade

	06	05	04	03	02	01		
Agriculture								
·Agriculture	0	0	1	2	0	1	4	
·Animal Husbandry	1	0	0	0	0	0	1	5
Architecture								
·Naval Architecture	0	0	0	0	1	0	1	1
Business								
·Accounting	1	0	0	1	0	0	2	
·Aviation Management	0	0	0	4	1	4	9	
·Aeronautical Operations	0	0	0	1	1	1	3	
·Business Administration	1	3	1	20	3	9	37	
·Business Management	0	1	1	0	0	0	2	
·Commerce	1	0	0	0	0	0	1	
·Economics	1	0	0	1	1	2	5	
·Industrial Management	0	0	1	4	1	1	7	
·Management	0	3	0	1	0	0	4	
·Marketing	0	0	1	2	0	1	4	74
Education								
·Education	0	1	0	2	1	1	5	
·Industrial Arts	0	0	2	3	2	2	9	
·Industrial Education	0	0	1	0	0	0	1	
·Music	0	0	0	1	0	0	1	
·Physical Education	0	1	1	0	1	2	5	
·Speech	0	0	0	0	1	0	1	22

	06	05	04	03	02	01		
Engineering								
•Aircraft Maintenance	0	0	0	3	0	1	4	
•Aeronautical	0	1	3	35	9	8	56	
•Chemical	0	1	1	4	3	2	11	
•Civil	0	1	0	0	0	0	1	
•Electrical	1	1	9	20	2	6	39	
•Engineering	0	1	1	5	2	1	10	
•Industrial Design	0	0	0	0	0	1	1	
•Industrial	0	0	2	3	0	3	8	
•Industrial Technology	0	1	1	0	0	2	4	
•Mechanical	1	0	1	9	2	5	18	
•Naval Science	3	6	6	5	1	1	22	
•Oceanography	0	0	1	0	0	0	1	
•Textile	0	0	1	0	0	0	1	176
Fine Arts								
•Fine Arts	0	0	0	0	0	1	1	1
Humanities								
•English	0	0	0	1	0	0	1	
•Philosophy	0	1	0	0	0	0	1	2
Natural Sciences								
•Anthropology	0	0	0	1	0	0	1	
•Astronomy	0	0	0	0	0	1	1	
•Biology	0	0	0	2	3	2	7	
•Computer Science	0	0	0	0	0	1	1	

	06	05	04	03	02	01		
•General	1	0	0	0	0	0	1	
•Geology	1	0	0	1	0	0	2	
•Mathematics	0	2	3	11	5	4	25	
•Metallurgical	0	0	2	1	0	0	3	
•Meteorology	0	0	0	0	1	0	1	
•Physical	0	1	2	4	6	1	14	
•Psychology	0	1	1	3	1	3	9	
•Statistics	0	0	1	0	0	0	1	
•Zoology	1	1	0	0	0	1	3	69
Social Sciences								
•Foreign Affairs	0	0	3	1	0	0	4	
•Government	0	1	1	1	0	0	3	
•History	0	0	4	4	2	1	11	
•International Relations	0	0	0	1	0	0	1	
•Social Science	0	0	0	7	1	0	8	
•Political Science	1	0	0	2	3	0	6	33
None								
•None	5	16	14	4	1	1	41	41

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   Subj: Career Maintenance Management Officer Program

4. CINCPACFLT ltr Ser 42/3260 of 10 Aug 1965
   Subj: Career Aviation Maintenance Management Officer Program; requirements for

5. CNO ltr Ser 4005P50 of 1 Sep 1965
   Subj: Career Aviation Maintenance Management Officer Program; requirements for

6. COMFAIRNORFOLK ltr Ser 1545 of 19 July 1965 with COMNAVAIRPAC 1st end Ser 4207 of 13 Aug 1965 CINCLANTFLT 2nd end Ser 2692/171 of 1 Sep 1965
   Subj: Aircraft Maintenance Department (AMD) Officers; assignment of

7. COMNAVAIRPAC ltr Ser 65/5195 of 16 Sep 1965 with CINCPACFLT end Ser 7/4500 of 21 Oct 1965
   Subj: Aircraft Maintenance Department (AMD) Officers; assignment of

8. CNO ltr Ser 4018P50 of 24 Nov 1965
   Subj: Aircraft Maintenance Department (AMD) Officers; assignment of

9. Report on a meeting of the Career Planning Board OP-100C3/mg of 3 Nov 1965 BUPERS ltr Pers-B1144-mla of 7 Jan 1966
   Subj: DOD Maintenance Engineering Program

10. CNO ltr Ser 04003P50 of 8 Feb 1966
    Subj: Department of Defense Maintenance Engineering Program (U)

11. COMNAVAIRPAC ltr Ser 935 of 28 Feb 1966
    Subj: Department of Defense Maintenance Engineering Program

12. SECNAV Basegram 1421 of 17 May 1966
    Subj: Selection of Officers

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